



**STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION**

DIVISION OF UNDERGROUND STORAGE TANKS

COMPLIANCE GUIDANCE DOCUMENT - 110

**EFFECTIVE DATE - July 29, 1996
(REVISION DATE – July 28, 2005)**

RE: REQUIREMENTS FOR LEAK DETECTION ON UNDERGROUND PRESSURIZED PIPING

The purpose of this guidance document is to assist the regulated community in understanding the regulatory requirements for Rule 1200-1-15-.04(2)(b). This rule states the following:

1. *Pressurized piping. Underground piping that conveys petroleum under pressure shall:*
 - (i) *Be equipped with an automatic line leak detector conducted in accordance with Rule 1200-1-15-.04(4)(a); and*
 - (ii) *Have an annual line tightness test conducted in accordance with Rule 1200-1-15-.04(4)(b) or have monthly monitoring conducted in accordance with Rule 1200-1-15-.04(4)(c).*

Rule 1200-1-15-.04(4) states the following:

Methods of release detection for piping. Each method of release detection for piping used to meet the requirements of Rule 1200-1-15-.04(2) must be conducted in accordance with the following:

- (a) *Automatic line leak detectors. Methods which alert the operator to the presence of a leak by restricting or shutting off the flow of petroleum through piping or triggering an audible or visual alarm may be used only if they detect leaks of 3 gallons per hour at 10 pounds per square inch line pressure within 1 hour. An annual test of the operation of the leak detector must be conducted in accordance with the manufacturer's requirements.*
- (b) *Line tightness testing. A periodic test of piping may be conducted only if it can detect a 0.1 gallon per hour leak rate at one and one-half times the operating pressure.*
- (c) *Applicable tank methods. Any of the methods in Rule 1200-1-15-.04(3)(e) through (i) may be used if they are designed to detect a release from any portion of the underground piping that routinely contains petroleum.*

INTRODUCTION

Pressurized piping has become an integral part of the petroleum industry. Petroleum conveyed under pressure allows fuel to be dispensed faster. Although this is a very advantageous aspect of pressurized piping, there are some disadvantages.

In a pressurized piping system, a submerged centrifugal pump moves stored product from the tank to the dispenser. The delivery piping extends from the pump discharge point to the dispenser. The product is essentially "pushed" from the tank under positive pressure.

Piping and associated loose fittings cause the majority of petroleum releases from UST systems. Catastrophic releases can occur very quickly if a hole or break occurs in a pressurized pipeline. The pump will continue to push product through the line and through the hole or break. Higher line pressures will result in higher leak rates when a hole

develops.

It is not hard for one to see that if faulty piping is “pressurized” with petroleum what the result could be. Release detection is required for pressurized piping. There are several types of release detection methods for pressured piping and each method has advantages.

REQUIREMENTS FOR PRESSURIZED PIPING

Pressurized piping must have one leak detection method from group A and one from group B below:

A. Automatic Line Leak Detector:

- Mechanical (flow shutoff, or flow restrictor); or
- Electronic; or
- Continuous alarm system that triggers an audible or visible alarm

B. Other Methods:

- Monthly groundwater monitoring; or
- Monthly vapor monitoring; or
- Monthly interstitial monitoring; or
- Monthly Statistical Inventory Reconciliation (SIR); or
- Other release detection method for tanks, or
- Annual line tightness testing; or
- Monthly test (0.2 gph) or annual test (0.1 gph) result of electronic line leak detector.

Automatic Line Leak Detectors:

At installation, an automatic line leak detector (ALLD) must be able to detect a leak as small as 3 gallons per hour at a line pressure of 10 pounds per square inch. The ALLD must shut off product flow, restrict product flow, or trigger an audible or visual alarm. An annual test must be conducted in accordance with the manufacturer’s requirements on each ALLD to ensure it is operating as designed. ALLD manufacturers specify when their equipment is no longer operating as designed and must be replaced.

ALLDs monitor line pressure in a variety of ways; for example, monitoring for a line pressure decrease over time, or monitoring the time to achieve operating pressure, or evaluating pressure fluctuations.

- Flow restrictors keep the product flow at 3 gallons per hour when a leak is detected. This pressure is well below the usual flow rate.
- A flow shutoff completely cuts off product flow or shuts down the pump when a leak is detected.
- A continuous alarm system constantly monitors line conditions and immediately triggers an audible and/or visual alarm if a leak is detected. Automated vapor or interstitial line monitoring systems can also operate continuously by sounding an alarm, flashing a signal on the console, or ringing a telephone when a leak is detected.

Line Tightness Testing:

If line tightness testing is selected, it must be conducted annually. A line tightness test must be able to detect a leak as small as 0.1 gallon per hour at one and one-half times normal operating pressure. For more information concerning

line tightness testing, see Compliance Guidance Document (CGD)- 112.

Groundwater Monitoring, Vapor Monitoring, Interstitial Monitoring, and SIR:

Groundwater monitoring, vapor monitoring, interstitial monitoring, and SIR all have the same regulatory requirements for piping as for tanks. For more information concerning these methods of monthly monitoring see Compliance Guidance Documents (CGDs)- 105, 106, 107, and 108 respectively.

Sump Sensors:

Sump sensors are a form of interstitial monitoring. Interstitial monitoring is one of the monthly monitoring methods of release detection. Tank owners may use sump sensors for periodic monitoring according to rule 1200-1-15-.04(3)(i)2. as long as they comply with the following conditions regarding their use:

1. Tank owners/operators must be able to provide documentation that demonstrates that product loss from any location in a primary pipe will be fully contained in secondary piping and be conveyed to a sump where a sensor is located.
2. An annual functional test must be conducted for each sensor and results documented or the tank owner must demonstrate that annual testing is not required. Any time a sensor is found to be non-functional and/or is non-operational, it must be immediately repaired or replaced.
3. Tank owners/operators must agree to keep sumps clean, dry, and free of debris and remove anything that would interfere with sensor operation.
4. Sensors must be placed at the lowest point in the sump where liquid can accumulate.
5. Tank owners/operators may not render sensors inoperable in the event of ground water or surface water entering the sump. Doing so would be failure to conduct line leak detection.
6. Tank owners/operators must create a record each month indicating that they have physically (visually) inspected each sump equipped with a sensor and verified that no releases have occurred. If this record can be created by electronic means from an ATG console that would be acceptable.

If a tank owner/operator is unable to document the required site conditions and/or is unwilling to create the record, he must conduct an annual line tightness test or employ another means of monthly monitoring for pressurized piping. An Agreement (attached as Appendix 1) will be provided for the tank owner/operator to execute describing the conditions that must be met in order to continue using sump sensors.

REPORTING AND RECORDKEEPING

If the results from any tightness testing indicate the tank and/or lines may have had a release of petroleum, then the Division must be notified within 72 hours of a confirmed release. Owners and/or operators must take immediate action to prevent any further release of the petroleum into the environment, and take immediate action to identify and mitigate fire, explosion, and vapor hazards. Owners and/or operators must repair or replace the UST and/or piping, and begin corrective action in accordance with Rule 1200-1-15-.06 if the test results for the system, tank, or delivery piping indicate that a leak exists.

If monitoring results from the ALLDs, groundwater monitoring, vapor monitoring, interstitial monitoring, or SIR indicate the UST system may have had a release, then the owner and/or operator shall notify the Division within 72 hours and begin release investigation and confirmation steps in accordance with Rule 1200-1-15-.05(3). This applies unless: the monitoring device is found to be defective, and is immediately repaired, recalibrated, or replaced, and additional monitoring does not confirm the initial result. If the monitoring device is determined to be defective and a suspected release was not reported to the Division, the owner/operator shall document that the device was

defective and the actions taken for correction. This documentation shall also include additional monitoring results.

Results of the most recent tightness testing must be maintained. Results of testing from monthly monitoring must be maintained for at least one year.

ALLDs must be tested annually and results maintained for at least one year. The results should include, but are not necessarily limited to the following:

1. Printed and signed name of the individual checking and recording the test results.
2. Date testing was performed.
3. Results of testing and/or status of ALLDs.
4. If a problem was detected, describe what actions were taken.

Anyone using sump sensors for monthly monitoring must create a monthly record indicating the leak detection condition at each sensor. If the sensors are self-diagnosing, this record may be a monthly ATG sensor status report. Another acceptable record would be a paper record or log indicating that each sensor has been physically (visually) inspected on a monthly basis. This record must indicate the date of the inspection, name of the individual performing the inspection, and whether the sump sensor is operational. It shall also indicate if a release has occurred. Appendix 2 (page 6 of this CGD) may be used to document checks of sensors.

Records of all calibration, maintenance, and repair of release detection equipment that is permanently located on-site, must be maintained for at least one year after the servicing work is completed. Any schedules of required calibration and maintenance provided by the release detection equipment manufacturer must be retained for five (5) years from the date of installation. Records of the UST system repairs must be maintained for the life of the UST system.

Records must be kept at the UST site and be immediately available for inspection by the Division, or at a readily available alternative site and be provided for inspection to the Division upon request.

Appendix 1

PIPELINE INTERSTITIAL MONITORING AGREEMENT

4/20/2005

For each facility where interstitial monitoring is used for pressurized piping leak detection, tank owners must certify that all conditions listed below have been met. If **all** applicable boxes are not checked, interstitial monitoring (or sump sensors) may not be used for pressurized piping at this facility.

For ALL forms of Interstitial monitoring of pressurized piping, the following must be verified:

- ☐ All product piping is contained within secondary containment conduit piping and containment sumps.
- ☐ The system is designed and installed so that if there is a breach in the primary piping, any released product will be fully contained in secondary containment where product loss can be detected.
- ☐ Sumps must be properly maintained and any water or debris that interferes with the proper operation of the interstitial release detection system must be promptly removed.
- ☐ The system must be designed and operated so that a release is detected prior to any product leaving the secondary containment system, or fully contained so that it does not leave the secondary containment system.
- ☐ An independent means of catastrophic line leak detection (such as line mechanical or electronic line leak detectors) must also be used with pressurized piping in addition to interstitial monitoring (such as sump sensors)
- ☐ A monthly record indicating the leak detection condition must be created. This record must indicate the date of the inspection, the individual performing the inspection, and if a release has occurred.
- ☐ On all new installations, fittings, flanges, seals, entry boots and sumps must be properly installed and maintained to prevent leakage from the containment sumps. Sealants used in the installation must be compatible with the product stored.

When sump sensors are used for interstitial monitoring of pressurized piping the following must also be verified:

- ☐ Sensors must be placed at the **lowest point** in the secondary containment where liquid can accumulate. If only one sump sensor is installed in a commonly connected system the sensor must be placed in the lowest part of the system.
- ☐ An annual functional test must be performed for each sensor and results documented in accordance with the manufacturer's specifications and maintained for one year. (If manufacturer does not recommend testing of the sensors, a manufacturer's statement stating that must be on site and available for inspection.)
- ☐ If the sensors are self-diagnosing, a monthly record must be produced either by the ATG indicating the operational status at each sensor (sensor status report), or a manually created record or log indicating that each sensor has been physically (visually) inspected on a monthly basis and found to be operable.
- ☐ If sump sensors become inoperable for any reason, another means of piping release detection must be used. Any time a sensor is found to be non-functional or operating improperly it must be repaired or replaced within 72 hours.

If the required site conditions cannot be documented, or the monthly record not created, then an annual line tightness test must be conducted or another means of monthly monitoring for pressurized piping must be used at this facility.

By checking the boxes, I understand and agree to all the conditions for using interstitial monitoring and/or sump sensors for pressurized piping. Failure to operate the monitoring system in compliance with this user agreement may result in the UST Division's denial of approval for use of this system.

Signature of Owner date

Print or Type Name of Facility Owner / Title

FACILITY NAME

FACILITY ID NUMBER

STATE OF _____ COUNTY OF _____

witness my hand and official seal, this _____ day of

Before me personally appeared

AD _____

who executed this instrument for the purposes therein
expressed.

Notary Public
My commission expires _____

Appendix 2

SUMP SENSOR MONITORING MONTHLY RECORD

UST Facility Name _____

UST Facility ID # _____

Address _____

Checked Mo/Da/Yr	Sensor Number and Location (tank or dispenser)								Observer's Name	Comments
Sensor Num.	# 1	# 2	# 3	# 4	# 5	#6	# 7	#8		
Location										
Sensor Status										
(Example)	OK- sump dry	OK- no alarms	OK-little water, removed	No alarms	Alarm-water, removed sensor reset	OK	OK sump dry	OK sump dry	"Tank" Onaz	One alarm- no leak problem fixed
Jan / /										
Feb / /										
Mar / /										
Apr / /										
May / /										
Jun / /										
July / /										
Aug / /										
Sept / /										
Oct / /										
Nov / /										
Dec / /										